Zero Retries issue 0111 2023-08-11

Zero Retries is an independent newsletter promoting technological innovation in Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology. Now in its third year of publication.

About Zero Retries

Steve Stroh N8GNJ, Editor

Jack Stroh, Late Night Assistant Editor Emeritus

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Web version of this issue - https://www.zeroretries.org/p/zero-retries-0111

Request To Send

Editorial by Steve Stroh N8GNJ

W1WRA is the Newest Zero Retries Founding Member

My thanks to **William Arcand W1WRA** who is Zero Retries Founding Member 0003, joining:
Founding Member 0000 - Steven Davidson K3FZT
Founding Member 0001 - Chris Osburn KD7DVD
Founding Member 0002 - Don Rotolo N2IRZ

***First*, There's a Writer…**

I get some pushback about my many thought experiments explored in Zero Retries. One prominent example is Amateur Radio Moonshots - My Presentation for MicroHAMS Digital Conference 2023. One category of feedback was "Why bother to even speculate about this kind of thing? It can *never* happen."

Optimist that I am, I think ideas I describe here in Zero Retries *can* happen… because I've seen other people's ideas (that *I* never could have imagined) become reality.

Two examples of Zero Retries Interesting ideas *I* couldn't imagine:

- The emergence of ARDC as a stable source of ~$5M funding annually for Zero Retries Interesting projects, scholarships, research and development, etc. That amount of money enables some amazing ideas.

- The emergence of a data communications system for Amateur Radio that was faster than 9600 / 19200 bps Frequently Shift Keying (FSK) without specialized hardware such as hardware 9600 FSK modems… until it was proved out with VARA FM.

I could go on (ad nauseum…) but you get the idea.

Ideas are actually easy, and prolific. I'll guess that everyone has ideas every day about how things could be better. Given a receptive ear, they'll happily share those ideas.

There are very few lucky people who can take *their* ideas, *directly* to reality because *they're* in a position to *implement* their idea, such as Brian Kantor WB6CYT did with ARDC, and Jose Alberto Nieto Ros EA5HVK did with VARA FM. My most recent example of the ability to *directly* implement *their* ideas is the new products coming out of Turn Island Systems that flow directly from the ideas of Paul Elliott WB6CXC.

But most of us can't implement our ideas ourselves - we need help. That's where the vast majority of ideas hit a dead stop, because while your idea is fully formed in *your* head, transferring the complete idea to someone who can help you implement your idea is hard, and almost always incomplete. Sometimes you get lucky, and the person helping you *gets* it, asks all the right questions, and teases the idea out of you. But, usually, it doesn't happen that easily.

That's when it's time to write things down. Until recently, when the Writer's Guild of America went on strike, I hadn't paid much attention to the fundamental role of writers in video productions. *First*, someone has to *write things down*. Before *anything* can happen, there has to be a script[1] so that anyone who follows in the process can understand the *totality* of the idea. *No one who can help* a project, a movie, etc. — be it a respected actor, a financier, a special effects company, a programmer, an engineer… can do *anything* until *they can read something in their*

hands.

Writing down an idea in detail certainly isn't a guarantee that an idea can be realized. I think one of the saddest examples of that reality, that's Zero Retries Interesting, is Bruce Perens K6BP's prescient 2017 commentary to the FCC about reimagining US FCC Amateur Radio regulations to reflect the realities of Amateur Radio in the 21st century.

> I am not in general asking for rules to be merely *simplified*. Rather, I am asking for **modernization** of rules, some of which have remained **unchanged for 65 years or more.**

You can read it for yourself here:

Perens Et 17 215
588KB · PDF file
Download
Download

In my opinion, K6BP did a *masterful* job of writing down his ideas (and I agree with the almost all of his ideas), but unfortunately, his work did not result in any meaningful change in US Amateur Radio regulations. But, kudos! *He tried! He…* ***tried!***

I confess that I cannot implement most of my ideas (thought experiments) by myself. I'm not a programmer, I'm not an engineer, I'm not a program manager, and I'm not wealthy enough to hire people with the requisite skills, etc. But what I can do is try to write down my ideas in (hopefully) sufficient detail that if someone else finds that my ideas have merit and have the ability to take it forward, they have enough detail (the "script") to do so.

And… before someone takes me justifiably to task about my promises to concatenate thought experiments into one place for seamless reading, such as an Amateur Radio payload in GEO orbit for the Western Hemisphere, an open source equivalent for VARA FM, and Neil's Night… point taken and I will be fixing that in the near future now that Substack has fixed a substantial bug that was impeding my progress.

So I'll keep writing thought experiments in hopes that someone with more skills and / or resources, finds them of interest and decides to use *their skills and resources* to try to make the idea into a reality.

Lastly, having mentioned ARDC above, yes, an ARDC grant is a potential solution to getting an idea implemented - but not for *me*. Being the Editor of Zero Retries, an independent publication, is sufficient conflict of interest with ARDC's requirements for grantees that it's best overall that I not directly involve myself in any future ARDC grants. I can certainly *help* those that want to apply for an ARDC grant, but it's best that I not be a grantee.

Rebuttal to Don Rotolo N2IRZ's Digital Connection in May, 2023 CQ Amateur Radio

By Steve Stroh N8GNJ

I don't know why CQ Magazine chose to publish a few of their 2023 issues as PDFs with no download restrictions - see KE9V's article for a bit more context.

In Zero Retries 0099, I wrote Publicly Accessible Amateur Radio Content, where I said in part:

> I recently read a Zero Retries Interesting article about the growing trend to (re)create Amateur Radio networks using the better Packet Radio technology of this era (such as Raspberry Pi computers vs Z80-based TNCs). The author made a number of good points, and a few points that I don't agree with. I'd enjoy having a public discussion with the author.
>
> *But, because the article is hidden behind a paywall, a debate wouldn't be that interesting because those wanting to follow the debate couldn't read the original article.*

At least for the moment, *that article* is no longer hidden behind a paywall, so *now* it's worth commenting on because you *can* read it. First, download the May, 2023 issue of CQ Amateur Radio2. Then, browse to pages 51 - 54 where you'll find:

digital connection
by Don Rotolo N2IRZ
The Whys and Which(es) of Networks
Help Deciding What You Need.

N2IRZ is a friend of long standing, and one of the first readers of Zero Retries, and he's Zero Retries Founding Member 0002. N2IRZ and I have a running correspondence about Amateur Radio data communications and our respective views. I've also shared the following thoughts about Amateur Radio data communications with Tadd Torborg KA2DEW, who is also a Zero Retries reader.

Please read N2IRZ's article for the full context of these excerpts.

Build a Network *Solely* with Point-to-Point Links?

N2IRZ:

> Other architectures – hub and spoke for example – don't work. As with user ports in most terrain, you have the problem of Hidden Transmitter Syndrome (HTS), where two stations both see the station between them but not each other. This allows one station to transmit while the other is (unknowingly) also transmitting, meaning that neither station gets through. Not a recipe for performance. Point-to-point is just about the only RF architecture worth considering. A duplex repeater just perpetuates the user-operator mentality.

One of the most profound experiences I've had in Amateur Radio was the creation of what I came to call the Puget Sound Amateur Radio TCP/IP Network in the 1990s which included several 9600 bps Frequency Shift Keying (FSK) bit regenerative *repeaters*. Yep. *Repeaters!* Not listen-buffer-for-a-while-then-transmit digipeaters on the same (or different) frequency. Our data repeaters were

full-duplex, standard offset, VHF / UHF Amateur Radio repeaters. The only thing unique about those repeaters was that they only passed *data*. Thus, I have deep experience to say that putting up a repeater as an element of your Amateur Radio data network has significant benefits, such as:

- The network is easy access to many more users than a network of simplex links. You don't need a big, directional antenna high up to access the network. A lot of the repeater users had omnidirectional antennas and low power radios.

- There are very few collisions because everyone hears everyone else equally well - you know when someone else is transmitting.

- It was unique to the nature of those repeaters, but it was far easier to get your 9600 bps FSK radio working via a repeater because the repeater compensated for minor issues in your transmissions (bit regeneration) and you only had to adjust your modem for one transmitter… not many as you would have to do on a simplex channel (that was shared by multiple users).

One subtle benefit of our data repeaters that didn't emerge until later was that they were proof-of-concept that *data was viable to do over repeaters*. The vast majority of Amateur Radio Operators think that data cannot, or should not, be done via a repeater. *Isn't that what digipeaters are for?* Another factor was encountering data being used over repeaters piqued some curiousity, as in "you're doing *data* over repeaters? Oh, cool, I want to play!".

Thus, my experience about the viability of building a network solely out of Point-to-Point links *varies considerably* from N2IRZ's perspective. *It's hard* to put up a directional antenna and find a partner to connect to who's willing to put up a port (modem + radio + antenna) *solely to communicate with you*. One of the biggest issues Amateur Radio has in attracting new folks is that the "barriers to entry" for participating in such networks is very high, as outlined above. It's almost like N2IRZ is describing a rite of passage in getting connected to the network.

Thus, in my opinion, while point-to-point links are useful

- They're not very (new) user friendly,

- They don't scale,

- They can get expensive.

I don't think N2IRZ's recommendations in his article are *wrong*, but I do think that his recommendations aren't the only way to do Amateur Radio networks.

Peer-to-Peer Only, no Shared Infrastructure?

N2IRZ's observations of the social aspects of building networks (the pesky humans) differ from my observations. N2IRZ states:

> Having a caste system of users and operators tends to hurt a network. User ports seem like a good idea, until you find that users resent the operators because they won't provide (service-name-here) that a user thinks is needed. Operators start resenting users since all the money, time and effort is coming from operators to support

> ungrateful users. And, when the network fails, or operators leave, the poor user (who has no experience or visibility into network operations) has absolutely no idea how to proceed.

That's a valid observation, and we certainly saw this play out in the 1990s with Packet Bulletin Board System (PBBS) operators that eventually tired of the pesky users. Rarely mentioned is that some BBS operators became "Syslords" and began to censor messages flowing through their BBS, which led to complaints and reduction in users, which created a vicious cycle that sometimes led to the closing of a PBBS. But in Amateur Radio we see continuing proof that Amateur Radio Operators, informal groups, and organized clubs *can and do support shared infrastructure such as repeaters*. It helps that repeaters are "service neutral" - they're just transport, and thus many people can get together to support them in common cause.

Amateur Radio Data Networks are for… *Typing*?

This is one of the primary issues I have with NCPacket and the TARPN architecture as described by N2IRZ:

> The only way for data to get onto the network is by typing it in – automated connections are not allowed.

Very technically, N2IRZ contradicts himself here as he describes the use of network protocols such as G8BPQ, TheNET / NetROM, and FlexNet so that any network user can chat with any other network user without needing a direct connection with every other user thanks to inter-port routing. Thus there is automated data (network updates) on the network that wasn't "typed in".

No email? Well, that's a shame as email messages is one of my favorite parts[3] of Amateur Radio data communications.

Also, no bulletins? No file transfers? Given the limited bandwidth of a network like NCPacket, I *get* that doing a file transfer of a John Denver MP3 would be poor network etiquette on a typical evening when the chat is flowing freely. But why not allow patient, non-realtime activities like email, bulletins, file transfers, etc. during the wee hours when the network is lightly or not used? Being able to do these many different kinds of data activities is kind of the *point* of data communications over Amateur Radio.

To the perspective that if I want to do a file transfer, just use the Internet, well, no. The *point*, for me, of experimenting with Amateur Radio data communications is to *do such things over Amateur Radio*.

Credit Where Due - NCPacket is a Working Network

Despite my differences in opinion with N2IRZ (and KA2DEW) about the TARPN philosophy of Amateur Radio data networks, the existence and growth of the NCPacket network is a powerful proof of concept.

Revisiting the APRS Foundation

By Steve Stroh N8GNJ

A few updates about APRS.

I was reminded recently that it's now been more than one year since Bob Bruninga WB4APR, the creator of Automatic Packet Reporting System (APRS), became a Silent Keyboard. WB4APR wasn't just the creator of APRS, he was effectively a benevolent dictator over the evolution of APRS, and his passing created a vacuum about the future direction of APRS in Amateur Radio.

In Zero Retries 0035 - APRS Foundation, Inc. Formed, I reposted an email from the TAPR aprssig mailing list dated 2023-03-02 that the APRS Foundation (APRSF) has been formed. Since then, I don't recall having seen any public statements about the APRS Foundation, and I confirmed that there had not been any updates by browsing through the aprssig archives from that announcement to current date. But, Jason Rausch K4APR recently told me that there is considerable behind-the-scenes activity within APRSF.

There's now an APRS Foundation website - www.aprsfoundation.org:

> Formed in 2022, APRS Foundation, Inc. (a Delaware Corporation), is a non-profit organization dedicated to the preservation and advancement of the Automatic Packet Reporting System* (APRS) digital communications protocol.
>
> There's a lot to do and APRS Foundation Inc. is just getting started!
>
> If you have any interest in learning more, or already know about the foundation and want to help, please reach out via the Contact Us form.

Unfortunately, the **Contact Us** form incorporates one of those inane "captchas" that no matter how careful you are to select the squares as instructed, just keeps cycling to another set, thus I was unable to send them my message:

I would like to be kept informed on the activities of the APRS Foundation, and report on its activities in my newsletter Zero Retries.

I'm glad to see that the leadership of the APRS Foundation is now public:

- Lynn Deffenbaugh KJ4ERJ
- Jeff Hochberg W4JEW
- John Langner WB2OSZ
- Jason Rausch K4APR (not yet listed on the website)
- John Tarbox WA1KLI

While we're waiting for APRS Foundation to come out of semi-stealth mode and reveal what their plans and goals are, recently there were several lively and informative exchanges on the aprssig list regarding the proposed (but never implemented) OpenTRAC protocol - 1, 2, 3. John Gorkos AB0OO described an interesting application (need) for an APRS-like system:

> We have a very large event that takes place over ~3500 acres of desert. It's perfectly flat, and about 80,000 people show up for it.

While there's an enormous installed base of embedded devices that use the existing APRS protocol and specification thus demanding a high degree of backwards compatibility, there's a *lot* more that could be done to modernize and harmonize APRS. With WB4APR's benevolent dictatorship no longer a factor (but continuing his inspiration and enthusiasm) in the evolution of APRS, it will be interesting to watch what APRS Foundation will do.

Leave a comment

Share

Feedback Loop

Comments (if any) for this issue.

ZR > BEACON

By Steve Stroh N8GNJ

Short mentions of Zero Retries Interesting items.

RFBitBanger Kit - Mostly Digital Modes HF Radio

I mentioned the RFBitBanger in Zero Retries 0092 - Amateur Radio and the Big Disruption including its interesting backstory. I'm particularly interested in the new SCAMP data mode being developed for the RFBitBanger.

> Be a part of the future with a prototype kit build of the RFBitBanger, a low-power high-frequency digital radio by Dr. Daniel Marks KW4TI. Presented by Open Research Institute, this kit is designed to produce 4 watts of power and opens up a new digital protocol called SCAMP. Your donation in exchange for this kit directly enables the development of an innovative Class E amplifier based radio design. It has a display, button menu navigation, and keyboard connection for keyboard modes and keyboard-enabled navigation. This radio can be taken portable or used in a case. If you have a 3d printer, then Dr. Marks has a design ready for you to print.
>
> - Built-in digital modes: CW, RTTY, SCAMP (FSK and OOK, multiple speeds)
> - Key jack supports straight keys and iambic paddles
> - Open Source hardware and firmware, Arduino UNO compatible https://github.com/profdc9/RFBitBanger
> - External sound-card FSK digital modes supported (including FT4/FT8)
> - Experimental SSB support

- Serial port support (2400 baud) for send and receive in keyboard modes

The “Send Me a Kit” contribution is $150:

> You will receive a functional prototype RFBBitBanger QRP HF Radio kit with display to enjoy and use. You will need to install the through-hole components and wind toroids. The surface mount parts are pre-installed.

I can envision the RFBitBanger going viral as an HF radio appliance for data communications.

Real **Crystal Radio Kit**

Appropos of coverage of Resurrected Heath*kit* last week and the RFBitBanger *kit* above, this seemed an appropriate moment to mention this Crystal Radio (receiver) kit that really *looks* the part. This isn’t a simulated crystal radio receiver - what you see is all there is. Yep, *it didn’t take much* back in the day to receive AM broadcasts.

Image courtesy of United Nuclear Scientific

There are Crystal Radio kits and there are Crystal Radio kits, but this is truly the ultimate kit.

The one thing all kits have in common (including our own very popular Crystal Radio kit) is that they include a modern diode as part of the radio circuit. Although this is great for radio performance and ease of assembly, it is not really authentic as they did not have modern Germanium diodes back when Crystal Radios were developed.

Our new Ultimate Crystal Radio kit comes with an authentic ‘Cat's Whisker’ diode - which is what was used in the original Crystal Radio sets. A Cat's Whisker diode is the ‘old time’ version of a modern semiconductor diode. It consists of a crystal of absolutely pure Germanium in a small holder - with a spring loaded pin (the Cat's Whisker) to make electrical connection to it. Even small Germanium crystals are very expensive, but we've been able to locate a quantity of Germanium crystal for a reasonable price, making a true Cat's Whisker Crystal Radio kit affordable.

Image courtesy of United Nuclear Scientific

The vendor of this product has an *interesting* backstory - just browse around the site.

SDRconnect Preview is available to download

SDRplay is pleased to announce that a preview build of SDRconnect, our new multi-platform SDR and server software is available to download from https://www.sdrplay.com/sdrconnect/

The current preview build of SDRconnect is just at the beginning of the development process. It contains a number of features, including [excerpts]:

- Multiple VRXs with basic radio controls
- Remote server with two streaming modes across both LAN and WAN (internet): a) Full IQ and b) Audio – a streaming mode which provides a very efficient way of displaying a large spectral bandwidth across a network with a limited data throughput.
- Calibrated Power meter and S-Meter
- Headless server command line options
- SNR Measurement

My favorite feature of SDRConnect is that one of the supported operating systems (formerly, only Windows) is:

Raspberry Pi OS (64bit) – Bullseye derived (we recommend the Raspberry Pi 4B or better)

Yay! This means a SDRPlay RSP1A (~$125) and a Raspberry Pi 4 can be assembled for < $250. Raspberry Pi 4's (4 GB) are available again just in time!

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, check out
Join the Fun on Amateur Radio for some pointers.

Zero Retries Frequently Asked Questions (FAQs) — In development 2023-02.

Closing the Channel

In its mission to highlight technological innovation in Amateur Radio, promote Amateur Radio to techies as a literal license to experiment with radio technology, and make Amateur Radio more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to everyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex, which hides Amateur Radio content behind paywalls.

My ongoing ***Thanks*** to:

- Tina Stroh KD7WSF for, well, *everything!*

- **Founding Members who generously support Zero Retries financially:**
  Founding Member 0000 - Steven Davidson K3FZT
  Founding Member 0001 - Chris Osburn KD7DVD
  Founding Member 0002 - Don Rotolo N2IRZ
  Founding Member 0003 - William Arcand W1WRA

- Numerous Annual and Monthly subscribers who also generously support Zero Retries financially!

Want to Support Zero Retries?

- The *most* effective way to support Zero Retries is to simply mention Zero Retries to your co-conspirators that are also interested in knowing more about technological innovation that is occurring in Amateur Radio and encourage them to become a fellow subscriber.

- One particularly effective method of promoting Zero Retries is to add a mention of Zero Retries to your QRZ page (or other web presence) and include a link:

  https://www.zeroretries.org

- If you'd like to financially support Zero Retries, becoming a paid subscriber is *greatly* appreciated and helps offset expenses incurred in publishing Zero Retries. Paid subscriptions for Zero Retries are *entirely optional*, as explained in this special issue of ZR: Zero Retries Administrivia - Activating Payment Options.

These blogs and newsletters regularly feature Zero Retries Interesting content:

- Dan Romanchik KB6NU mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.

- Jeff Davis KE9V also mentions "Zero Retries Interesting" topics so regularly on his blog (that I otherwise wouldn't know about) that I've bestowed on him the honorific of Pseudostaffer.

- Amateur Radio Weekly by Cale Mooth K4HCK is a weekly anthology of links to interesting Amateur Radio stories.

- Experimental Radio News by Bennet Z. Kobb AK4AV discusses (in detail) Experimental (Part 5) licenses issued by the US FCC. It's a *must-read-now* for me!

- RTL-SDR Blog - *Excellent* coverage of Software Defined Radio units.

- TAPR Packet Status Register has been published continuously since 1982.

- Other Substack Amateur Radio newsletters recommended by Zero Retries.

These YouTube channels regularly feature Zero Retries Interesting content:

- HB9BLA Wireless by Andreas Spiess HB9BLA

- KM6LYW Radio by Craig Lamparter KM6LYW (home of the DigiPi project)
- Modern Ham by Billy Penley KN4MKB
- Tech Minds by Matthew Miller M0DQW

The Substack email publishing platform makes Zero Retries possible. I recommend it for publishing newsletters.

If you're reading this issue on the web and you'd like to see Zero Retries in your email Inbox every Friday afternoon, just click below to join ~~100~~ ~~200~~ ~~300~~ ~~400~~ *500* ~~600~~ ~~700~~ *800+* other readers:

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Please tell your co-conspirators about Zero Retries — just click:

Share Zero Retries

Offering **feedback or comments** for Zero Retries is equally easy — just click:

Leave a comment

If you're a fellow smart person that uses **RSS**, there *is* an **RSS feed for Zero Retries**.

Zero Retries (N8GNJ) is on Mastodon — n8gnj@mastodon.radio — just click:

Zero Retries / N8GNJ on Mastodon

Email issues of Zero Retries are "instrumented" by Substack to gather basic statistics about opens, clicking links, etc.

More bits from Steve Stroh N8GNJ:

- SuperPacket blog — *Discussing new generations of Amateur Radio Data Communications — beyond Packet Radio (a precursor to Zero Retries)*
- N8GNJ blog — *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs — Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ / WRPS598 (He / Him / His)
These bits were handcrafted (by a mere human, not an Artificial Intelligence bot) in beautiful Bellingham (The City of Subdued Excitement), Washington, USA.

2023-08-11

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Blanket permission granted for TAPR to use any Steve Stroh content for the TAPR Packet Status Register (PSR) newsletter (I *owe* them from *way* back).

1

Just saying *script* is admittedly a vast oversimplification of the process of writing a screenplay.

2

Corrected the link 2023-08-12.

3

True story - I talked my way into a new job as a System Administrator mostly on the strength of having learned TCP/IP and services such as email over our Amateur Radio TCP/IP network.